

E72-10224

CR-129157

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Semi - Annual Report
April to September 1972
ERTS Proposal No. 106
GSFC Ident. No. C0309
P.I.: Dr. A.E. Strong

TITLE: Evaluation of ERTS Data for Certain Oceanographic Uses

A. OBJECTIVE

ERTS-1 MSS data will be analyzed for water color variations in the Great Lakes and Chesapeake Bay to determine whether broadband (0.10 μ m) multispectral imagery can be utilized to locate and map the extent of distinct water masses.

B. WORK SUMMARY DURING FIRST HALF YEAR PERIOD

1. Coordination was maintained with IFYGL to assure maximum surface truth is obtained during ERTS-1 overflights.
2. A major satellite/aircraft/ship study is planned for 12-16 October in the Lakes Ontario/Erie area.
3. An additive color viewer (Spectral Data) was purchased and delivered 25 August. This instrument has been found to be quite useful.
4. A short presentation was made at the NASA/GSFC ERTS Seminar on 29 September 1972: "Detection of Circulation Features in the Great Lakes". Since no imagery had been delivered to us of the Lakes Erie/Ontario test site the presentation (summary attached) dealt with Lakes Michigan and Superior.
5. Special processing of the imagery from GSFC was needed to emphasize the features in the ocean areas. NOAA/NESS has developed a capability to develop copies (either prints or transparencies) that yield excellent water detail.

(E72-10224) EVALUATION OF ERTS DATA FOR
CERTAIN OCEANOGRAPHIC USES Semiannual
Report, Apr. - Sep. 1972 A.E. Strong
(National Environmental Satellite Service)
Sep. 1972 4 p
CSCL 08C 63/13 00224
N73-11318
Unclas

6. Other areas investigated

- a. Rhode Island Sound - 28 July
- Buzzards Bay - 28 July
- Plymouth Harbor - 28 July
- b. Monterey Bay - 25 July
- c. Indonesia - ? ?

C. EXPECTED ACCOMPLISHMENTS DURING NEXT REPORTING PERIOD

1. A major satellite/aircraft/ship study will provide data over Lakes Erie/Ontario that will show how successful ERTS-1 will be in detecting water masses. Thermal-IR will be flown in an aircraft (NOS Buffalo) since no NOAA-2 satellite will be operational by that time.
2. It is anticipated that imagery from other periods will become available. Whenever clear skies prevail computer tapes will be requested retrospectively to be analyzed at NOAA/NESS and compared with the IFYGL ship data.
3. What limited data we have seen in Lakes Michigan and Superior show great color variability and excellent agreement with known near-surface circulation patterns.

D. PROBLEMS

ITOS-D (now NOAA-2) was not launched until 15 October and will not be operational until early November. However, all systems appear in good operating condition so that we should have near-coincident (0900 local time) 1/2 n. mile IR and visible imagery to compare with ERTS-1 during the winter months.

Now that ERTS-1 imagery delivery problems have been corrected at GSFC we are receiving data regularly and are currently only 30 days behind acquisition times.

ERTS Seminar at NASA GSFC on 29 September 1972

"Detection of Circulation Features in the Great Lakes"

A.E. Strong, NOAA

SUMMARY

Nearly two inches of rain flooded the Duluth, Minnesota area between 5 and 7 August 1972. As this water drained off the land flowing out into Lake Superior it carried a vast load of sediment, mostly clay and silt. On 12 August ERTS-1 viewed the area and witnessed western Lake Superior to be very turbid. The sediments served expeditiously to color the currents thereby revealing circulation patterns over much of the lake west of the Apostle Islands. A cyclonic gyre, approximately 25 miles in diameter was revealed by the turbid waters, immediately off Duluth-Superior. The waters along the entire southern shoreline showed an eastward transport through the Apostle Islands.

The same storm produced suspended sediments along the western Lake Michigan shoreline that ERTS-1 viewed 9 August. Concentrations of turbidity were greatest near Milwaukee and Chicago. Coastal currents were southward.

As expected, the red (0.6 - 0.7 μ m) channel is optimum for revealing turbid features. Intensity correlates well with surface turbidity measurements. Not only are currents in these Great Lakes waters easily identified, but diffusion and dilution of these currents, can be demonstrated through the use of ERTS-1 imagery.